What is claimed is:

1. A method for heat treatment of coatings comprising:

positioning a ceramic adjacent to a coating to be treated;

exposing said ceramic to a microwave beam having a predetermined frequency and power density which are sufficient to heat at least a selected area of the ceramic to a desired temperature whereby said coating will be adhered to an applied metal surface without temperature degradation of the metal.

2. The method of claim 1 wherein the microwave beam is a gyrotron beam.

3. The method of claim 1 wherein the ceramic is selected from a group consisting of oxide ceramic materials in a solid state or a powder based on silicon dioxide, and oxides of aluminum, zirconium, or magnesium having a melting point higher than 2000C.

4. The method of claim 1 wherein the microwave beam frequency is between about 10 GHz to about 200 GHz.

5. The method of claim 1 wherein the microwave beam is delivered to said ceramic in a quasi optical manner.

6. The method of claim 5 wherein the microwave beam is delivered to said ceramic by a metal mirror.

7. The method of claim 6 wherein the necessary configuration of the microwave beam and uniformity of power within the microwave beam is formed by said metal mirror.

8. The method of claim 6 wherein the necessary temperature distribution within said ceramic is formed by a scanning microwave beam via the mirror.

9. The method of claim 1 wherein a top surface of the ceramic which is farthest from the said coating is exposed to the microwave beam.

10. The method of claim 1 wherein the thickness of said ceramic is approximately equal to the skin layer for the selected microwave beam frequency.

11. The method of claim 1 wherein the thickness of said ceramic is preferably selected to be in the range of 1 to 5 mm.

12. The method of claim 1 wherein a bottom surface of the ceramic which is facing said coating is exposed to the microwave beam.